



[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA-2013-0899; Special Conditions No. 25-522-SC]

Special Conditions: Airbus Model A350-900 Airplane; Control-Surface Awareness and Mode Annunciation

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are issued for Airbus Model A350-900 airplanes. These airplanes have a novel or unusual design feature associated with control-surface awareness and mode annunciation provided by the electronic flight-control system. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

DATES: Effective Date: [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

FOR FURTHER INFORMATION CONTACT: Joe Jacobsen, FAA, Airplane and Flightcrew Interface Branch, ANM-111, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, Washington, 98057-3356; telephone (425) 227-2011; facsimile (425) 227-1320.

SUPPLEMENTARY INFORMATION:

Background

On August 25, 2008, Airbus applied for a type certificate for their new Model A350-900 airplane. Later, Airbus requested and the FAA approved, an extension to the application for FAA type certification to November 15, 2009. The Model A350-900 airplane has a conventional layout with twin wing-mounted Rolls-Royce Trent XWB engines. It features a twin-aisle, 9-abreast, economy-class layout, and accommodates side-by-side placement of LD-3 containers in the cargo compartment. The basic Airbus Model A350-900 airplane configuration accommodates 315 passengers in a standard two-class arrangement. The design cruise speed is Mach 0.85 with a maximum take-off weight of 602,000 lbs.

These special conditions for control-surface awareness, applicable to Airbus Model A350-900 airplanes, require suitable flight-control-position annunciation and control-system mode of operation to be provided to the flightcrew when a flight condition exists in which nearly full surface authority (not crew-commanded) is being utilized. Suitability of such a display must take into account that some pilot-demanded maneuvers (e.g., rapid roll) are necessarily associated with intended full performance, which may saturate the surface. Therefore, simple alerting systems, which would function in both intended or unexpected control-limiting situations, must be properly balanced between needed crew awareness and nuisance features. A monitoring system that might compare airplane motion and surface deflection, and pilot side-stick controller (SSC) demand, could be useful for elimination of nuisance alerting.

Type Certification Basis

Under Title 14, Code of Federal Regulations (14 CFR) 21.17, Airbus must show that the Model A350-900 airplane meets the applicable provisions of 14 CFR part 25, as amended by Amendments 25-1 through 25-129.

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 25) do not contain adequate or appropriate safety standards for the Model A350-900 airplane because of a novel or unusual design feature, special conditions are prescribed under § 21.16.

Special conditions are initially applicable to the model for which they are issued. Should the type certificate for that model be amended later to include any other model that incorporates the same or similar novel or unusual design feature, the special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the Airbus Model A350-900 airplane must comply with the fuel-vent and exhaust-emission requirements of 14 CFR part 34 and the noise-certification requirements of 14 CFR part 36. The FAA must issue a finding of regulatory adequacy under section 611 of Public Law 92-574, the “Noise Control Act of 1972.”

The FAA issues special conditions, as defined in 14 CFR 11.19, under § 11.38, and they become part of the type-certification basis under § 21.17(a)(2).

Novel or Unusual Design Features

The Airbus Model A350-900 airplane incorporates the following novel or unusual design features: electronic flight-control system providing control-surface awareness and mode annunciation to the flightcrew.

Discussion

With a response-command type flight-control system and no direct coupling from cockpit controller to control surface, the pilot is not aware of actual surface position utilized to fulfill the requested demand. Some unusual flight conditions, arising from atmospheric conditions and/or airplane or engine failures, may result in full or nearly full surface deflection. Unless the flightcrew is made aware of excessive deflection or impending control-surface limiting, piloted or auto-flight system control of the airplane might be inadvertently continued in such a manner as to cause loss of control or other unsafe stability or performance characteristics.

These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

Discussion of Comments

Notice of proposed special conditions No. 25-13-15-SC for Airbus Model A350-900 airplanes was published in the *Federal Register* on December 17, 2013 (78 FR 76254). No comments were received, and the special conditions are adopted as proposed.

Applicability

As discussed above, these special conditions apply to Airbus Model A350-900 airplanes. Should Airbus apply later for a change to the type certificate to include another model incorporating the same novel or unusual design feature, the special conditions would apply to that model as well.

Conclusion

This action affects only certain novel or unusual design features on the Airbus Model A350-900 airplanes. It is not a rule of general applicability.

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701, 44702, 44704.

The Special Conditions

Accordingly, pursuant to the authority delegated to me by the Administrator, the following special conditions are issued as part of the type certification basis for Airbus Model A350-900 airplanes.

Current airworthiness standards do not contain adequate safety standards for the design. In addition to the requirements of §§ 25.143, 25.671 and 25.672, the following special conditions apply:

1. The system design must ensure that the flightcrew is made suitably aware whenever the primary control means nears the limit of control authority.

Note: The term “suitably aware” indicates annunciations provided to the flight crew that are appropriately balanced between nuisance and necessary crew awareness.

2. If the design of the flight-control system has multiple modes of operation, a means must be provided to indicate to the crew any mode that significantly changes or degrades the normal handling or operational characteristics of the airplane.

Issued in Renton, Washington, on July 11, 2014.

Michael Kaszycki,
Acting Manager, Transport Airplane Directorate,
Aircraft Certification Service.

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